Indiana Department of Education
Academic Standards Course Framework

WAREHOUSE OPERATIONS AND MATERIALS HANDLING

Warehouse Operations and Materials Handling introduces the physical components of finished product handling. The focus is on the methods, mechanical equipment, systems and related controls used to achieve these functions. Topics covered include product receiving, storage methods, order picking, inventory control, lean concepts, packaging, and palletizing. Operating and maintaining material handling equipment in a safe and efficient manner in an industrial setting is stressed. The course applies these concepts to develop a work environment that promotes continuous improvement, eliminates waste, reduces operating cost, improves quality, and achieves measurable improvement in customer satisfaction.

- DOE Code: 5602
- Recommended Grade Level: Grade 11-12
- Recommended Prerequisites: None
- Credits: 2-3 credits per semester, maximum of 6 credits
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- This course is aligned with postsecondary courses for Dual Credit:
    - Ivy Tech
        - ADMF 115-Materials and Processes for Manufacturing

Dual Credit
This course provides the opportunity for dual credit for students who meet postsecondary requirements for earning dual credit and successfully complete the dual credit requirements of this course.

Application of Content and Multiple Hour Offerings
Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences. When a course is offered for multiple hours per semester, the amount of laboratory application or work-based learning needs to be increased proportionally.

Career and Technical Student Organizations (CTSOs)
Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in SkillsUSA, the CTSO for this area.

Content Standards

Domain – Material Handling Equipment
Core Standard 1 Students select the correct material handling equipment to safely and efficiently load, unload and store materials.

Standards

WO-1.1 Identify the different types of material handling equipment

WO-1.2 Operate the material handling equipment used in distribution centers and warehouses

WO-1.3 Repair and maintain the material handling systems found in the facility

Domain – Storage Equipment

Core Standard 2 Students analyze the product's storage requirements and apply the criteria to select the proper storage site and method.

Standards

WO-2.1 Establish the equipment storage needs for a product

WO-2.2 Recognize and properly handle and store products based on their regulatory labeling

WO-2.3 Determine and justify the placement of a product based on consumer demand

Domain – Inventory Management

Core Standard 3 Students apply concepts of inventory control using industry standard systems, to reproduce and troubleshoot systems.

Standards

WO-3.1 Use bar code scanners and software to establish and validate inventory

WO-3.2 Identify the parts of a Radio Frequency Identification system

WO-3.3 Explain how the radio wave reacts in a RFID system

WO-3.4 Interpret and modify RFID tag information

Domain – Lean Principles

Core Standard 4 Students apply and adapt lean concepts in a warehouse or distribution facility to improve operations.

Standards

WO-4.1 Make comparisons of conventional operating concepts and philosophies in both service/supply industries to Lean concepts

WO-4.2 Demonstrate an understanding of the basic terms, disciplines, and concepts of Lean manufacturing

WO-4.3 Perform the ability to define, develop, and illustrate the disciplines of value stream mapping

WO-4.4 Identify the sources and types of waste-streams in a manufacturing or service/supply environment

WO-4.5 Define and identify the differences between value-added and non-value activities

WO-4.6 Identify and explain the major advantages of Lean over conventional operating methods

WO-4.7 Explain the principles of pull systems

WO-4.8 Define methodologies required to achieve continuous improvement

WO-4.9 Define the importance and need for making a commitment to achieve the implementation of Lean disciplines

WO-4.10 Examine concepts and processes that allow distribution and warehousing facilities the ability to remain competitive in global markets

Domain –Order Fulfillment

Core Standard 5 Students analyze procedures for getting orders together to improve the process.

WO-5.1 Create a plan for retrieving the items

WO-5.2 Physically picking the items (either automatically or manually)

WO-5.3 Demonstrate procedures for sorting items

WO-5.4 Package orders for delivery

Process Standards

Common Core Literacy Standards for Technical Subjects

Reading Standards for Literacy in Technical Subjects 11-12

The standards below begin at grade 11 and define what students should understand and be able to do by the end of grade 12. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations – the former providing broad standards, the latter providing additional specificity.

Key Ideas and Details

11-12.RT.1 Cite specific textual evidence to support analysis of technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

11-12.RT.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

11-12.RT.3 Follow precisely a complex multistep procedure when performing technical tasks; analyze the specific results based on explanations in the text.

Craft and Structure

11-12.RT.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific context relevant to *grades 11-12 texts and topics*.

11-12.RT.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

11-12.RT.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

Integration of Knowledge and Idea

11-12.RT.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

11-12.RT.8 Evaluate the hypotheses, data, analysis, and conclusions in a technical subject, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

11-12.RT.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Range of Reading and Level of Text Complexity

11-12.RT.10 By the end of grade 12, read and comprehend technical texts in the grades 11-CCR text complexity band independently and proficiently.

Writing Standards for Literacy in Technical Subjects 11-12

The standards below begin at grade 11 and define what students should understand and be able to do by the end of grade 12. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations – the former providing broad standards, the latter providing additional specificity.

Text Types and Purposes

11-12.WT.1 Write arguments focused on *discipline-specific content*.

11-12.WT.2 Write informative/explanatory texts, including technical processes.

11-12.WT.3 Students will not write narratives in technical subjects. *Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In technical, students must be able to write precise enough descriptions of the step-by-step procedures they use in their technical work that others can replicate them and (possibly) reach the same results.*

Production and Distribution of Writing

11-12.WT.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

11-12.WT.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

11-12.WT.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Research to Build and Present Knowledge

11-12.WT.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

11-12.WT.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectivity to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation

11-12.WT.9 Draw evidence from informational texts to support analysis, reflection, and research.

Range of Writing

11-12.WT.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.